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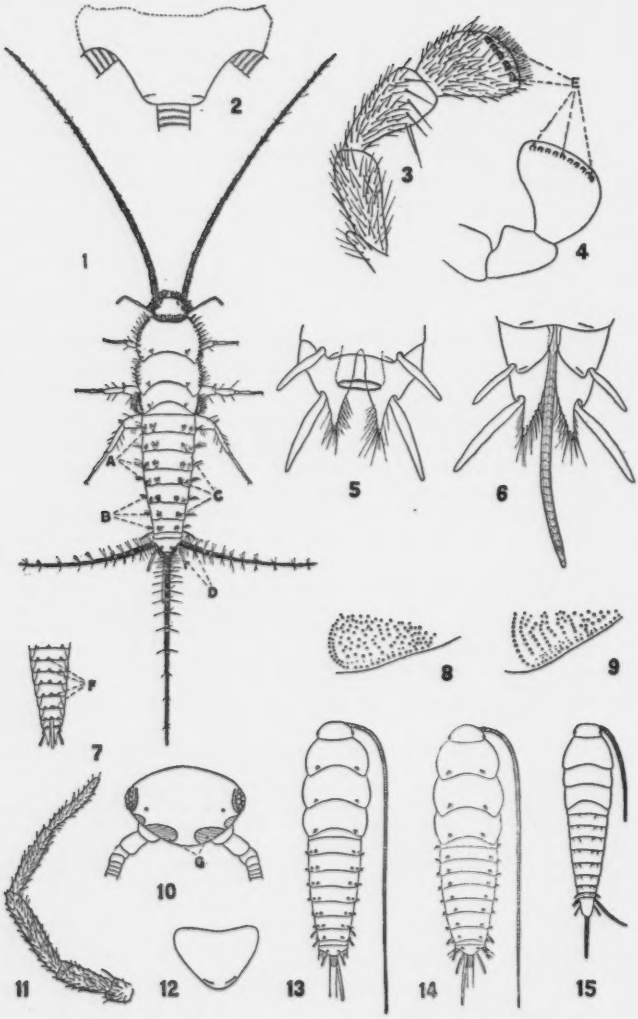


LEPISMATIDAE OF THE UNITED STATES—SLABAUGH.

ENTOMOLOGICAL NEWS

VOL. LI APRIL, 1940 No. 4

The History of the Riker Mount.

By STANLEY F. BAILEY, University of California, Davis, California.

During the past two years, a number of interesting facts have come to hand concerning the Riker Mount. In order that this material may be set down before the information is lost, this brief report has been prepared.

In conversation, Prof. T. I. Storer brought up the question of the origin of the widely-used biological specimen case called the Riker Mount. He stated that he knew that Judge Walter Fry, Park Commissioner, Sequoia National Park, California, had invented a case of this nature many years ago. Upon my inquiry, Judge Fry wrote (August 22, 1938), "Back in 1901 I began making collections of various sorts and mounting them on cardboard. I kept this up until 1905, when it became apparent that these cardboards would soon wear out through use. In 1906, I wrote the Welch Manufacturing Company at Chicago regarding specimen cases, outlining the sort of thing I wanted and the size. The specimen cases I had devised were laborious to make and not adapted to the larger specimens. I wanted something that had a telescope lid and other specimens could be added, not sealed like mine were. The Welch people advised that they could make these for me and quoted prices, and also asked if they might patent the idea.

"From then on until 1917, I purchased my cases from the Welch people. On August 9, 1917, all this collection together with papers and the correspondence with the Welch people, burned."

The writer searched the published records of the Patent Office, but could find no such patent granted to the Welch Company. However, the patent of C. B. Riker, No. 696,750,

of April 1, 1902, was located* describing the biological specimen mount or case as it is so commonly used today.

Through the kindness of Mr. C. M. Holmes of the Braun-Knecht-Heiman Company of San Francisco, Mr. Riker's address was located. Mr. Holmes' letter of August 1, 1939, however, presents some interesting additional facts . . . "Today we are in receipt of a letter from Mr. Jordan of the Jordan Paper Box Company of Chicago, in which he says that he finds that Mr. O. Fulda of the Butterfly Store, New York City, who has had long experience with Mr. C. B. Riker, informs him that in about 1900 Mr. Riker was engaged in the business of exporting drugs and made frequent trips to South America. He says that Mr. Riker became interested in butterflies and brought back several collections in wooden boxes. Because of the damage to the Butterflies through this method of packing, he was prompted to design the Riker Mount for the better handling and display of Butterflies and insects."

Upon writing to Mr. Riker of Newark, N. J., I received his reply (August 18, 1939): "Strangely, indeed just by accident, I discovered a pamphlet which I issued in 1903, which gives the whole history of the Riker Specimen Mount, together with its uses. This business was discontinued very shortly after that date and the patent sold to a concern in Providence, Rhode Island. The name of the people to whom I sold the patent has slipped from my mind.

From the above-mentioned pamphlet published by the Sydney Ross Company, 48 Vesey Street, New York, the introduction, historically, is well worth quoting:

For the past thirty years I have been a collector of insects and various other Natural History Specimens. The number of collections of greater or less size which I have seen go to ruin would have completely discouraged a person with less enthusiasm. After seeing a magnificent collection, the result

* Official Gazette, U. S. Patent Office, V. 99, part 1, page 144, April-May, 1902. Device for mounting entomological specimens. Clarence B. Riker, Maplewood, N. J. Filed Feb. 15, 1900, serial No. 5, 251 (no model).

of five months of busy application on the Amazon River, go to pieces in spite of the most approved cabinets for a pinned collection, I was almost in despair. Only a few months of absence abroad and the consequent lack of attention worked the ruin. After trying various plans and expending a considerable sum of money on patent mounts I became convinced of the entire unsuitableness of the methods in use, and set about to devise a simpler and more practical mount. The Riker Specimen Mount is the result.

In this mount, the insect can be advantageously shown in connection with its life history asd food-plant. Preparations may be made in mounts of uniform size and collections may be kept in library cases, accurately catalogued and readily accessible at all times. This mount has been in use in my own collection for five years, during which time I have not lost a single specimen nor can I observe any signs that any of the preparations are deteriorating to the slightest degree.

A collection on pins will deteriorate in spite of the most careful handling. The raising of the cover of the case or the slightest jar is often sufficient to loosen the brittle and dried wing or antennae and cause them to drop from the body. A fragmentary specimen is worse than none. Dust is certain to collect and dull the brilliancy of coloring, insect pins corrode and cover the body of the insect with verdigris, in fact so numerous are the deteriorating influences that it is well nigh impossible to preserve specimens in presentable condition. Pests (anthrenus and dermestes) add to the difficulty of the collector. Just how they infect specimens placed inside apparently hermetically sealed cases is a problem. The fact however remains that they do and that they cannot be effectually guarded against if the old style "pin mount" is used.

The plaster method offered a new means for mounting lepidoptera, but the detail of preparing the mount to suit the specimen, together with the inconvenience of having a collection in mounts of different size proved a rather serious obstacle to their use. The fragility of the mount and the brittleness of the dried insects made the glass mount of little practical value.

Friends who saw my collection became enthusiastic and advised securing a patent on the mounting device and placing it on the market. Application for the patent was made Feb. 5th, 1900, and the patent was granted on April 1st, 1902.

I can strongly indorse this mount as the most simple and satisfactory of all the means now on the market, for mounting and preserving Natural History Specimens and I can unhesitatingly recommend it for the use of both amateur and professional collectors. During the past year it has given me much pleasure to see these mounts in use in many of our leading Colleges and Experiment Stations as well as in the hands of a gratifying large number of private collectors.

The adaptability of this method for botanical purposes are suggested by its use with the food plants of insects.

The Botanical Mount does not have the deep box back of the insect case but it is similar in every other respect. It excludes the air and prevents dampness from affecting the specimen which causes the faded appearance and musty smell of ordinary herbariums.

As before intimated, my sole purpose in devising these mounts was for my own pleasure. If a small part of the pleasure which I have experienced in their use shall be the lot of those who may use them in the future, I shall feel repaid for my efforts in placing them within their reach.

Maplewood, N. J., April 2nd, 1903 C. B. Riker

Further information obtained from Mr. F. H. Ward, of Ward's Natural Science Establishment, furnishes the name of the concern which Mr. Riker had forgotten. Mr. Ward (September 28, 1939) wrote, "We did not have the department of entomology here until 1910, when we bought out the American Entomological Company's stock. At that time the only source for Riker Mounts, due to the fact that the patent had not run out, was the Angell and Cash Company of Providence, Rhode Island, and we secured our stock from them for a number of years."

Other information concerning the history of the Riker Mount may later come to light. However, at present these are the known facts. The writer has seen the original Fry Mounts and they are fundamentally the same as the present-day Riker Mount. Therefore, it seems that this type of specimen mount was invented independently by Mr. Riker and Judge Fry.

A New Thysanuran, and a Key to the Domestic Species of Lepismatidae (Thysanura) found in the United States.

By Ruth E. Slabaugh, Dept. of Entomology, University of Illinois, Urbana, Illinois.

(Plate III.)

While trapping for *Thermobia domestica* (Pack.), the firebrat, in one of the buildings of the University of Illinois, in January, 1939, an unknown species of the genus *Ctenolepisma* Escherich was caught. More specimens were captured at intervals throughout the year.

Ctenolepisma urbana n. sp.

♀. (Fig. 1).—Length: body, 15 mm.; antennae, 17 mm.; cercus, 10 mm.; median filament, 12 mm.; ovipositor as seen from below averaging 3.5 mm. Width, 3.5 mm. Body elongate, slender; thorax slightly wider than abdomen, which tapers weakly posteriorly. Body color white; dorsal surface with slate grey scales, when freshly molted much darker; ventral surface with white scales; setal tufts of head yellowish-golden; legs white, with golden hairs; cephalic aspect of distal end of femur with grey and white scales; cerci and median filament reddish with light segments at intervals.

Setal tufts of head prominent, with many radiating setae. Distal segment of labial palpus slightly shorter than the penultimate one, and weakly hatchet-shaped, with five large sensory papillae (Fig. 3); number of setae on inner edge of lacinia varying from 8-10; maxillary palpus 5-segmented (Fig. 11). Thorax strongly arched, more than half length of abdomen. Posterior edge of metasternal plate narrow, rounded (Fig. 12). Tergite X (Fig. 2) trapezoidal, with tip narrowed, very slightly emarginated, length less than combined lengths of tergites VIII and IX. Outer dorsal setal combs (Fig. 1, *A*)on abdominal tergites II to VI; thus, abdominal tergites II to VI with 3+3 setal combs (i.e., three on each side); tergites VII and VIII with 2+2; IX with none; and X with I+I. Two pairs of styli, second pair longer than first; ovipositor long and slender, extending beyond processes of sternite IX (Fig. 6).

♂.—Like the female, except for differences in genitalia (Fig. 5).

This species differs from *Ctenolepisma quadriseriata* (Pack.) (Fig. 13), the only other species of this genus recorded from

the United States, by the number of styli, shape of tergite X, by having six outer dorsal setal combs instead of five, and by scale coloring; it agrees with it in the comparative length of ovipositor and antennae. It is very similar to *Ctenolepisma longicaudata* Esch., a species of economic importance in Africa and Australia, but differs in the following respects. The species, *longicaudata,* has from 9-12 sensory papillae on the labial palpus (Fig. 4, *E*) while the five papillae in *urbana* (Fig. 3, *E*) were found constant in every stage of development examined, including first instar nymphs. The setae in the medial setal tufts of the head in *urbana* are much more numerous and more haphazard in position (Fig. 8; 10, *G*); in *longicaudata,* they are arranged in rather definite and widely spaced rows (Fig. 9). The slight indentation in the tip of tergite X is more consistent than in *longicaudata,* specimens of which were examined that had no emargination.

Holotype female. Urbana, ILLINOIS, June, 1939, in a basement room. *Allotype* and *paratypes* from same locality. *Holotype, allotype, paratypes* (2 ♂, 2 ♀), deposited in collection of the Illinois State Natural History Survey, Urbana, Illinois. Also, *paratypes,* 2 ♂, 2 ♀, in the United States National Museum, no. 53977; *paratypes,* 1 ♂, 1 ♀, in Museum of Comparative Zoology, Harvard University.

Remarks. 40-50 specimens were trapped in glass jars with flour bait, in two connecting rooms in a University building. One of these rooms, an infrequently used storeroom containing old museum exhibits from all over the world, suggests a possible introduction of this species from some other country.

Appreciation is expressed to Miss Eder Lindsay, University of California, Berkeley, California, for supplying specimens of *C. longicaudata* for comparison.

BIOLOGICAL NOTES.

The adults of this species, compared to the quick moving *T. domestica,* are much more quiet and move about slowly and ponderously, while the nymphs are more active. It has been found that they thrive in a high percent of relative humidity and a temperature of from 80-90°F. Whole wheat flour is readily accepted as food.

Eggs were laid by captured individuals in May and October and very young nymphs were trapped during these months. The eggs, creamy white in color, oval in shape, averaging 1.0 mm. in length and 0.77 in width, hatch in from 20-25 days. The young nymphs split the shell by means of a spine egg-burster situated on the head between the bases of the antennae. First instar nymphs are opaque white in color, without scales, with the antennae and caudal appendages short and stout, and the tarsus with a single segment. In the second instar, the body has a shiny, transparent appearance, the appendages have increased in length, and the tarsus has two segments. The head and posterior margins of the thoracic and abdominal segments have a rough, wide network of reddish-brown color. This coloring persists until scales appear in the fifth instar, but grows fainter in the third and fourth instars. The styli on the ninth sternite first appear in the fifth instar, and in one individual observed, the second pair appeared in the ninth instar. The total number of molts has not been observed.

Key to Domestic Species of Lepismatidae in the United States.

The following key is included to aid in the identification of those species of Lepismatidae that are found in houses in the United States. *Thermobia domestica* and *Lepisma saccharina* are the two very common species of economic importance.

1. Abdominal sternites with medial setal combs (Fig. 7, *F*); abdominal tergites without outer dorsal setal combs (i. e., 2 rows of setal combs on each side, or setae not in brushes or combs) (Figs. 14, 15).....2

1. Abdominal sternites without medial setal combs; abdominal tergites with outer dorsal setal combs (i. e., 3 rows of setal combs on each side) Figs. 1, *A*; 13).....3

2. Maxillary palpus six-segmented; cephalic and abdominal setae in tufts or combs, not single; tergite X trapezoidal, posterior margin not indented; ovipositor extending considerably beyond tergite X; three pairs of styli in female (Fig. 14), two in male; color of scales brown and tan. *Thermobia domestica* (Pack.)

2. Maxillary palpus five-segmented; cephalic and dorsal abdominal setae occurring singly or in small groups, never

in tufts or combs; tergite X long, rounded on posterior margin; ovipositor not visible beyond tergite X; two pairs of styli in both sexes; color of scales silver grey (Fig. 15).
Lepisma saccharina Linne.

3. Two pairs of styli (Fig. 1, *D*); outer dorsal setal combs on abdominal tergites II-VI (Fig. 1, *A*); tergite X trapezoidal (Fig. 2), with the posterior margin weakly emarginated; color of scales slate grey.
Ctenolepisma urbana n. sp.

3. Three pairs of styli; outer dorsal setal combs on abdominal tergites II-VII (Fig. 13); tergite X short, with the posterior margin not indented; color of scales violet brown, with four longitudinal stripes on abdomen.
Ctenolepisma quadriseriata (Pack.)

Note.—It is often advisable to clear and stain specimens so that the structures can be more easily seen.

EXPLANATION OF PLATE III.

Figs. 1-3. *Ctenolepisma urbana* n. sp.; 1, Entire insect, dorsal view, *A*, outer dorsal setal combs, *B*, lateral setal combs, *C*, inner dorsal setal combs, *D*, styli; 2, Tergite X; 3, Labial palpus, *E*, sensory papillae, which distinguish this species from *C. longicaudata.*

Fig. 4. *Ctenolepisma longicaudata,* labial palpus, *E*, sensory papillae.

Figs. 5, 6. *C. urbana;* 5, Sternites 8 and 9 and terminalia, male; 6, the same, female.

Fig. 7. *Lepisma saccharina,* ventral view of abdomen, *F*, medial setal combs.

Fig. 8. *C. urbana,* medial cephalic setal area showing arrangement of setae.

Fig. 9. *C. longicaudata,* medial cephalic setal area showing arrangement of setae.

Figs. 10-12. *C. urbana;* 10, dorsal view of head, *G*, medial setal areas; 11, maxillary palpus; 12, metasternal plate.

Fig. 13. *Ctenolepisma quadriseriata,* dorsal view.

Fig. 14. *Thermobia domestica,* dorsal view.

Fig. 15. *Lepisma saccharina,* dorsal view.

Undescribed Species of Crane-Flies from the Eastern United States and Canada (Dipt.: Tipulidae). Part VI

By CHARLES P. ALEXANDER, Massachusetts State College, Amherst, Massachusetts.

(Continued from page 85.)

Pedicia (Tricyphona) gigantea n. sp.

Size very large (wing 23 mm.); mesonotum light gray, the praescutum with four very distinct brown stripes; halteres yellow; femora obscure yellow basally, passing into brown at near midlength, the tips blackened; wings with a brownish yellow tinge, with a scarcely indicated dark seam on *r-m; Sc*$_2$ opposite origin of *Rs; R*$_{2+3+4}$ present, in oblique alignment with *r-m*.

Sex? Wing 23 mm.

Rostrum gray; palpi with basal two segments yellow, outer segments dark brown. Antennae with scape gray pruinose; pedicel brownish black, flagellum broken. Head light gray.

Mesonotum light gray, the praescutum with four very distinct brown stripes, the intermediate pair narrowly separated by an obscure line of the ground color; lateral stripes more grayish brown than the intermediate pair; scutellum paler gray. Pleura clear gray. Halteres yellow, the knobs undarkened.

Legs with the coxae light gray pruinose; trochanters obscure yellow; femora obscure yellow on basal half, passing into brown outwardly, the tips blackened; tibiae obscure brownish yellow, the tips narrowly brownish black; tarsi black.

Wings with a brownish yellow tinge, the prearcular and costal portions more saturated yellow; stigma deeper yellow; a very narrow to scarcely indicated dark seam on *r-m;* veins dark brown, a little brighter in the flavous portions. Venation: *Sc*$_2$ opposite origin of *Rs,* the latter long, angulated at origin, in longitudinal alignment with *R*$_5$; *R*$_{2+3+4}$ present, in oblique alignment with *r-m* and about one-half as long; cell 1*st M*$_2$ elongate; cell *M*$_1$ with petiole subequal to *m; m-cu* a short distance beyond fork of *M*.

Abdomen broken beyond the second segment; basal tergite light yellow on sides and on cephalic portion, the remainder dark brown; second tergite with lateral border pale yellow; basal ring bright yellow, the extreme cephalic portion and a narrow sublateral stripe dark brown; posterior ring chiefly occupied by two nearly confluent brownish black stripes; basal

two sternites chiefly pale. From the nature of the tergal pattern, it is probable that the succeeding tergites are uniformly darkened or with a very restricted median brightening only.

Habitat. — NORTH CAROLINA. *Holotype*: Sex? Black Mountains, May 23, 1912 (Wm. Beutenmuller); in the Academy of Natural Sciences, Philadelphia, from the Dietz Collection.

I am greatly indebted to Mr. Rehn and Mr. Cresson for the privilege of describing the very interesting species here considered. In December, 1912, I spent a most pleasant week with Dr. and Mrs. Dietz at Hazleton and together we examined the extensive Beutenmuller collection made the preceding spring in the Black Mountains of western North Carolina. Outstanding in this rich material was the single specimen upon which the above species is based; it is my recollection that the specimen then possessed an abdomen and that it represents the male sex. The specimen still bears the label "*Pedicia* sp." in my writing affixed at that date. Among all other regional species of *Tricyphona* the fly stands out by its great size, which rivals or exceeds that of species in the typical subgenus *Pedicia*, all of which have the characteristic dark pattern of the wings. Among the known species of *Tricyphona* within our limits, the fly comes closest to *P.* (*T.*) ***auripennis*** (Osten Sacken) but is amply distinct in its coloration, venation and unusual size.

Chionea stoneana n. sp.

Size small (length, about 4 mm.); general coloration dark brown, the antennae, legs and palpi brownish black; antennae 5-segmented, with only two flagellar segments beyond the fusion; male hypopygium with the gonapophyses protruding from the genital chamber as parallel darkened rods; ovipositor with cerci compressed, the lower edge conspicuously arcuate.

♂. Length about 4 mm.

♀. Length about 4-4.2 mm.

General coloration (in alcohol) dark brown, the abdominal membranes paler; antennae, palpi and legs brownish black. Antennae 5-segmented, with only two flagellar segments beyond the fusion-segment, the total length of these free segments subequal to the length of the fusion. Maxillary palpi

with terminal segment short-oval, obtusely rounded at apex. Legs with femora moderately incrassated, the setae abundant but not as erect and conspicuous as in *alexandriana*. Male hypopygium with gonapophyses protruding from the genital chamber as parallel, darkened rods that are straight or nearly so throughout their length. Ovipositor with cerci subacute at tips, more compressed-flattened and with ventral edge more arcuate than in *alexandriana;* hypovalvae obtuse at tips.

Habitat.—ILLINOIS. *Holotype*: ♀, on microscope slide, Urbana, December 11, 1938, in mouse nest (P. C. Stone); Collector's No. 220. *Allotopotype*, ♂, on microscope slide, in nest of field mouse, *Microtus ochrogaster* Wagner, December 16, 1939. *Paratopotypes*, 1 ♀, in alcohol, January 12, 1939, in mouse nest. 1 ♂, 1 ♀, February 2, 1940. I am indebted to the collector for the privilege of retaining the type male and female. The paratypes are preserved in the State Natural History Collection, Urbana, and in the Museum of Comparative Zoology.

I take unusual pleasure in dedicating this interesting crane-fly to the collector, Mr. Philip C. Stone, who discovered the materials upon which the species is based while making a study of the arthropoda in the nests of the Prairie Field Mouse. *Chionea stoneana* is most generally similar to *C. alexandriana* Garrett (Proc. Ent. Soc. Washington, 24: 62-64; 1922) of western North America. Both species have the number of antennal segments much reduced, in the present form there being only five, with two simple segments beyond the fusion-segment. Although *C. alexandriana* was described as having five antennal segments, material at hand shows six segments in the male, there being three segments beyond the fusion; in the female, the most basal of these three segments is apparently only partially separated from the fusion.

The present case shows the greatest reduction in number of antennal segments as yet discovered in the genus or in the entire family Tipulidae. Kratochvil (Bull. Soc. Ent. France, 1936: 250) has arranged the western Palaerctic species of *Chionea* into two groups, one of which, the *Chioneæ brachycornæ* (more correctly *brachyceræ*) includes those species with

six or seven antennal segments. The definition should be modified to include the 5-segmented condition of the present fly.

Erioptera (Ilisia) sweetmani n. sp.

General coloration of mesonotal praescutum orange-yellow, with indications of four more reddish brown stripes on posterior half; pleura light gray, striped longitudinally with dark brown, the latter color also including the lateral margin of the praescutum and scutum; femora chiefly blackened, the bases of fore femora and a post-medial ring on all legs yellow; tibiae uniformly yellow; wings light yellow, restrictedly patterned with dark brown, including a narrow but entire band at cord; *m* lying far distad; male hypopygium with the tergite bearing a median oval spatulate lobe that is provided laterally with long spinous setae; shoulders of tergite with groups of smaller spines.

♂. Length about 4.5 mm.; wing 5.5 mm.

Rostrum gray; palpi black. Antennae with scape blackened; succeeding segments yellow, the outer flagellar segments passing into brown; basal flagellar segments subcylindrical, the outer segments more elongate; longest verticils unilaterally distributed. Head brownish gray.

Pronotum yellowish gray medially, blackened on sides. Mesonotal praescutum clear orange-yellow, with indications of four more reddish brown stripes, especially evident on the posterior half of sclerite, the lateral margin of praescutum and scutum conspicuously brownish black; pseudosutural foveae and humeral pits pale; scutum and scutellum brownish gray, the scutal lobes a little darker; postnotum grayish brown. Pleura light gray, striped longitudinally with brown, including a dorsal line from the fore coxae across the ventral anepisternum onto the dorsal pteropleurite; meral region extensively darkened; dorso pleural membrane yellow. Halteres uniformly yellow.

Legs with the coxae gray; trochanters grayish yellow; femora chiefly blackened, the proximal fourth of fore pair obscure yellow; all femora with a narrow yellow ring beyond midlength, this narrowest on the fore and middle legs, broader on the posterior pair where it equals in extent the outermost black ring; extreme tips of femora brightened; tibiae and tarsi uniformly light yellow, only the outer tarsal segments darkened.

Wings light yellow, restrictedly patterned with dark brown spots, including a narrow but entire band at cord, ending at

vein *Cu;* other spots at origin of *Rs, Sc*$_2$, midlength of vein *Cu*, fork of M_{3+4}, *m* and a marginal series at ends of all longitudinal veins, smallest on R_4, larger on the anal veins; veins yellow, darkened in the clouded areas. Venation: *m* lying far distad, the outer section of vein M_3 less than twice *m* alone.

Abdomen dark brown, sparsely pruinose; hypopygium dark. Male hypopygium with the tergite distinctive; a medial oval spatulate lobe that is provided along its lateral margins with long spinous setae, the longest about one-third the length of the lobe; apex of lobe obtusely rounded; lateral shoulders of tergite on either side of median lobe with additional strong spinous setae. Outer dististyle relatively stout but regular in outline, without an outer lobe as in *armillaris*. Inner dististyle with apical blade narrow, much more so than in *lævis*. Gonapophyses appearing as slender black horns, the tips converging toward the midline, without a serrulate dilation before apical spine, as in *armillaris*.

Habitat.—GEORGIA. *Holotype*: ♂, Toccoa Falls, Stephens County, on cañon rocks and cliffs, April 19, 1939 (H. L. Sweetman).

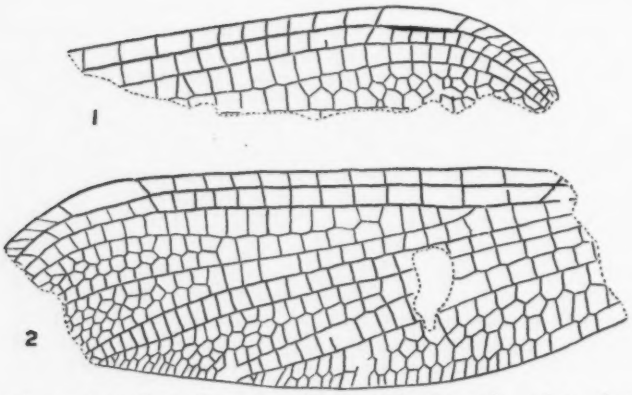
I am very pleased to name this interesting and unusually beautiful crane-fly in honor of my colleague at the Massachusetts State College, Dr. Harvey L. Sweetman. In its genitalic characters, it is quite distinct from *Erioptera* (*Ilisia*) *armillaris* Osten Sacken and *E.* (*I.*) *lævis* Alexander, both of northeastern North America.

A Dragon-fly from the Eocene of Colorado (Odonata: Agrionidae).

By T. D. A. COCKERELL, University of Colorado, Boulder, Colo.

In the vicinity of Roan Creek, north of DeBeque, Mr. John Player, of the University of Colorado Museum, found a very beautiful fossil dragon-fly in the Green River shales. The precise locality is along Scott's Trail, 100 feet or more above the rim.

The insect appears to be most nearly related to *Hypolestes* Gundlach (*Ortholestes* Calvert) from the West Indies, and the continental American genus *Archilestes*. It is so near to *Hy-*



polestes that I at first thought it might be referred to that genus, but on closer analysis it is evidently distinct. In giving the generic characters I follow the method of Calvert for *Ortholestes* (Proc. Acad. Nat. Sci. Phila., 1893, p. 377).

EOLESTES new genus.

(1) Medium sized species with robust thorax and unclouded wings, the anterior wing 31 mm. long.

(2) Nodus 11.6 mm. from base of wing and 14.5 from stigma; petiole slightly over 5 mm. long.

(3) Quadrangle with upper side longer than base, but not so long as the very oblique apical side, which meets the lower margin at a very acute angle. Thus the quadrangle is more like that of *Archilestes* than that of *Ortholestes*. The base of the quadrangle is however narrow (style of *Megalestes*), not broad as in *Archilestes*.

(4) Stigma large and long, as in *Archilestes*, but not appreciably swollen below. Its lower side is bounded by 4½ cells in one wing, 3½ in another (the upper wing of the opposite side).

(5) There are 12 to 14 cells on costa between nodus and stigma; this nearly agrees with *Archilestes; Ortholestes* has more.

(6) Nodus to second antecubital crossvein is 5.3 mm., apparently a shorter distance than in *Archilestes*.

(7) The nodal sector (M_2) arises 2½ cells beyond subnodus, essentially as in *Orthoiestes,* not as in *Archilestes.*

(8) The ultra-nodal sector (M_1a) arises four cells beyond origin of nodal sector, and is bounded above by a series of cells precisely as in *Orthoiestes;* below it are first seven simple cells, then four double ones, and after that there are three rows of small cells, all this essentially as in *Archilestes.* The vein M_1a is not evidently curved or arched below stigma.

(9) The subnodal sector (radial sector) has above it, from origin of M_2 onward, 11 or 12 simple cells, followed by three double, after which there is a reticulated pattern of small cells, reaching as many as five in a transverse row. This resembles *Archilestes* rather than *Orthoiestes,* though the latter varies, as shown by the figures of Calvert and Munz.

(10) Below the subnodal sector is a regular series of simple cells, the outer ones much higher than long, this agreeing essentially with *Megalestes.* Thus the median sector (M_4) remains parallel with and closely following the subnodal sector, quite unlike *Orthoiestes,* but suggesting *Megalestes.*

(11) Below the median sector, from the level of the subnodus out, are first about seven simple cells, then six or seven double ones, after which there are three or four small cells in a transverse row. This is suggestive of *Archilestes.*

(12) Cu_1 and Cu_2 are separated by a row of simple cells as in *Orthoiestes.*

(13) Below Cu_2 the wing is widened, with a dense reticulation of cells, four in a transverse row at the widest part. This is quite unlike *Orthoiestes* or *Archilestes,* and suggests such genera as *Devadatta* and *Diphlebia.*

(14) The femora have short widely spaced bristles, the distance between them greater than the length of one; the tibiae have longer bristles, on the inner side longer than the width of the tibia.

Eolestes synthetica new species

Characters as cited above.

The figures represent the anterior wings of the two sides. They were made by Professor Hugo Rodeck, who drew the veins over a photograph which was then bleached out. As originally collected, the body and bases of the wings could not be seen. With great difficulty, Professor Rodeck uncovered these sufficiently to show the characters described. The specimen is in the University of Colorado Museum.

Entomology at Dartmouth College.

President Ernest Martin Hopkins recently announced the establishment at Dartmouth College of the Henry Clinton Fall Fund for the promotion of the study of entomology. The fund is a memorial to the late Henry Clinton Fall of Tyngsboro, Massachusetts, Dartmouth graduate and internationally famous entomologist, from whose estate a capital fund of $5,000 has been received by the college. So that income for entomological research may be available at once, the bequest provides an additional amount for immediate expenditure.

The first use of the Fall Fund by the college will be to purchase entomological equipment for the Dartmouth College Museum, which plans a survey of the insect fauna of the Hanover area as part of its program to promote knowledge of the economic entomology of the region. The survey will also result in important additions to the 40,000 specimens already possessed in the various entomological collections at Dartmouth.

Dr. Fall, who died last November in his 77th year, was an authority on American beetles. He discovered more than 1400 new species during the research which he carried on in addition to his duties as high school teacher, and collected some 200,000 mounted specimens. A graduate of Dartmouth in 1884, he was honored with the degree of Doctor of Science in 1929. He was made a member of the permanent committee of the International Congresses of Entomology at Brussels, Belgium, in 1910, and also held membership in the Entomological Society of America, the American Association for the Advancement of Science, and the American Academy of Arts and Sciences.

The entomological collections in the Dartmouth College Museum have grown in the last ten years from virtually nothing to more than forty thousand specimens. Three quarters of these were acquired in 1929 through two gifts — the John Dexter Locke collection of moths, butterflies, and beetles, numbering over 25,000 specimens, which was presented by Mrs. Moses Dyer Carbee of Haverhill, New Hampshire; and the Charles Pliny Whitney collection of North American butterflies and moths, containing nearly 5000 specimens, which was presented to the College by Dr. Herbert Stillman Hutchinson, Dartmouth '75, and recently transferred from the Department of Biology to the Museum.

The remaining 10,000 specimens are the result, in large measure, of the collecting activities of the Museum's staff and students, directed chiefly to the filling in of other groups of insects not represented in these two collections. Numerous

small collections have also been presented in recent years, and the foundation for a good general collection now exists.

Until now, however, the growth and development of the collections have been severely handicapped by insufficient storage containers and other equipment, and field work has necessarily been curtailed. The income from the Henry Clinton Fall Fund will be used primarily for this purpose so that storage and study facilities may keep pace with the growth of the collection.

While the aim of the Museum is to build up a general teaching collection of insects, field work will naturally be chiefly in Vermont, New Hampshire and Maine, where a thorough survey is being planned. In so far as New Hampshire is concerned, the Museum will work in close cooperation with the recently organized Biological Institute of the University of New Hampshire.—*Dartmouth College News Service.*

On a Collection of Centipeds from Texas, New Mexico and Arizona (Chilopoda).

By Ralph V. Chamberlin and Stanley Mulaik,
University of Utah, Salt Lake City.

The collection of chilopods upon which this article is a report was made by the junior author and Mrs. Dorothea Mulaik at various times from 1933 to 1939, but mostly during the last of these years. Most of the collecting was done in Texas in Hidalgo County, in the extreme southeastern corner of the state and in and near Kerr County, in the south central section. The collecting in New Mexico was done at Camp Mary White, about fifteen miles southeast of Cloudcroft, in Bear Canyon, at an elevation near 8,000 feet. Only two species recorded here are from Arizona. Types are at present deposited in the collection at the University of Utah.

Cryptopidae.

Cryptops eques new species.

Head overlapping the first dorsal plate.

First dorsal plate with a transverse semicircular sulcus behind the margin of the head. Claws of prehensors of normal length; anterior margin of prosternum smooth and essentially straight. Last dorsal plate with caudal margin strongly convex but somewhat straight over middle portion.

Anal coxae truncate behind, not at all produced, the caudal margin with a few short setae. Femur of anal legs with numerous spines below and laterally, leaving no naked area below, replaced above by finer spines or short setae. The tibia clothed like the femur. Metatarsus with three teeth below, the first joint of the tarsus with two.

Length, about 6.5 mm.

TEXAS: Kerr County, Raven Ranch. One specimen taken in August and many in December, 1939; Brooks County, December, 1939.

The species seems to be distinct from *C. hyalinus* in the differences in the sculpturing of the first dorsal plate, i. e., the semicircular impression in place of the angulation and depression at the middle in *hyalinus*, and in the fewer number of teeth on metatarsus and tarsus I.

SCOLOPENDRIDAE.

SCOLOPENDRA HEROS Girard. In Marcy's Rep. Expl. Red River, 1854, p. 272, pl. 18.

TEXAS: Brewster County, Rock Springs, July, 1933; Edinburg, May 1936 and October, 1937; Kerr County, at the Raven Ranch, July and August, 1939. Many specimens.

S. VIRIDIS Say, Proc. Acad. Nat. Sci. Phila., 1821, p. 110.

TEXAS: Kerr County, Raven Ranch, July-August, and December, 1939, many specimens; Bandera County, 7 miles north of Medina.

S. POLYMORPHA Wood, Proc. Acad. Nat. Sci. Phila., 1862, p. 11.

ARIZONA: 32 miles south of Prescott, Sept. 8, 1939; east of Geronimo, 7 Sept., 1939; Navajo Indian Reservation, Sept. 9, 1939; and Junction on Route 66, Sept. 7, 1939.

S. MORSITANS Linne.

TEXAS: Big Springs. A young specimen taken in December, 1939, is referred with some doubt to this species.

HIMANTARIIDAE.

GOSIPHILUS LATICEPS (Wood).

STRIGAMIA LATICEPS Wood, Journ. Acad. Sci. Phila., 1862, ser. 2, vol. 5, p. 49.

TEXAS: Kerr County, Raven Ranch, Aug., 1939, two speci-

mens; Bandera County, one young specimen with 87 pairs of legs taken in December, 1939.

G. AUXIMUS Chamberlin, Entomological News, 1938, vol. xlix, p. 254.

TEXAS: Edinburg. Male holotype taken Oct. 16, 1936.

SCHENDYLIDAE.

SIMOPORUS new genus.

Labrum with median arc wide, toothed. Mouthparts in general structure as in *Nyctunguis*. Some of the sternites with pores in a definite, undivided field. Coxae of anal legs with a single large pore. Tarsus of last legs two-jointed, terminating in a well-developed claw.

Genotype.—Simoporus texanus, new species.

This genus is close to *Nyctungius* from which it differs in having only one large gland on each anal coxa instead of two.

Simoporus texanus new species.

Head longer than wide (cir. 7:6); posterior margin truncate, the anterior convex; sides convex; widest near middle. No frontal suture present. Basal plate with greatest width about 2.8 times the length. Articles of antennae of moderate length, the ultimate about equal in length to the two preceding taken together. Labrum with median arc bearing about 17 teeth of which the 3 or 4 at each end have fine curved tips and suggest the form of the pectinations each side of the arc; the ten teeth of middle portion of arc darker, more conical and closer together. Mandible bearing typically five long teeth not united into distinct blocks.

Joints of prehensors unarmed within; no chitinous lines present; claws when closed equalling anterior margin of head or nearly so. Spiracles all circular. Ventral pores numerous; in a median circular area on the sternite. Last ventral plate wide. Coxae of last legs large, the axis extending caudolaterad. A single large pore on each side at edge of sternite. Anal pores not evident.

Genital appendages rather slender, biarticulate in both sexes. Anal legs in female slender throughout, terminating in a well developed claw. In the male the anal legs are crassate, especially the third, fourth and fifth articles, while the tarsal articles are abruptly thinner, with the ultimate thinner than the penult which is somewhat intermediate.

Pairs of legs 55-61, but mostly 57 or 59.

Length, about 25 mm.

TEXAS: 2 miles north of Medina, Bandera County. Six specimens, males and females, taken Dec. 16, 1939.

GEOPHILIDAE.

ARENOPHILIUS UNASTER (Chamberlin).

GEOPHILUS ATTENUATUS UNASTER Chamberlin, Ann. Ent. Soc. America, 1909, vol. 2, p. 179.

ARENOPHILIUS UNASTER Chamberlin, Bull. Mus. Harvard, 1912, vol. 54, p. 417.

TEXAS: Edinburg, 1934; Kerr County, Raven Ranch, July, August and December, 1939, common; Brooks County, north of Alice, December; Bandera County, north of Medina, December; Kendall County, December; Big Springs, 15 December, 1939.

GEOPHILUS MISSOURIENSIS Chamberlin, Entomological News, 1928, vol. XXXIX, p. 153.

TEXAS: Edinburg. One specimen taken 13 Feb., 1939.

PACHYMERIUM FERRUGINEUM (C. L. Koch).

Geophilus ferrugineus C. L. Koch, Syst. der Myr., 1847, p. 187.

TEXAS: 5 miles northwest of Hidalgo. One specimen taken Nov. 28, 1936.

Linotaenia kerrana new species.

On the last intercalary segment a pleurite on each side adjacent to the tergite is distinctly developed and separated from the tergite. Body very sparsely hirsute. Anal glands distinct.

Cephalic plate with posterior margin angular, the border well overlapped by the basal plate. Sides of cephalic plate convex, the plate narrowing cephalad, rounded anteriorly. Antennae with ultimate article somewhat longer than the two preceding taken together.

Claws of prehensors normal; each bearing at base a rather small acute tooth. Spiracles small, circular, the anterior not enlarged.

Anal legs in female equal in size to the penult legs. Anal coxae large, bearing few, typically four, moderately large pores on each, these arranged along margin of sternite, the last ventral sternite triangular.

Pairs of legs, 45.

Length, 20 mm.

TEXAS: Kerr County, Raven Ranch. One female taken in December, 1939.

Related to *L. chionophilya* (Wood) but apparently quite distinct in the form of the last sternite and in the number and arrangement of the coxal pores.

(To be continued.)

Current Entomological Literature

COMPILED BY V. S. L. PATE, L. S. MACKEY and E. G. FISHER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within ( )follows; then the pagination follows the colon :

Papers published in the Entomological News are not listed.

GENERAL.—Anon.—Entomology at Dartmouth College. [68] 91: 184. **Ayyar, T. V. A.**—Entomology in India—a retrospect. [Indian J. Ent.] 1: 9-16. **Earle, O.**—Insect factories. [Nat. Hist.] 45: 44-45, ill. **Evans, W. H.**—Scientific names: a plea. [9] 73: 5-7. **Fall, H. C.**—Obituary by E. G. Linsley. [55] 16: 1-3, portrait. **Hafez, M.**—Some ecological observations on the insect-fauna of dung. [Bull. Soc. Fouad d'Ent.] 1939: 241-287, ill. **Janssens, E.**—See under Coleoptera. **Mani, M. S.**—Autophotographs of some Indian butterflies. [Indian J. Ent.] 1: 111. **Pennington, C. E.**—List of Bulletins of the Agricultural Experiment Stations for the calendar years 1937 and 1938. [U. S. Dept. Agric.] Misc. Publ. No. 362: 91 pp. **Pruthi, H. S.**—Record of some insects from a hot spring in the Kulu Valley, Punjab. [Indian J. Ent.] 1: 65-67. Host selection by insect parasites. [Indian J. Ent.] 1: 115-116. **Pruthi & Samuel.**—A microcage. [Indian J. Ent.] 1: 110. **Sachtleben, H.**—Dr. Walther Horn zum Gedächtnis. [110] 6: 217-222. **Vanni, V.**—Osservazioni e ricerche sperimentali in una endemia di Leishmaniosi cutanea. [Mem. R. Acc. d'Italia] 10: 87-104, ill. **Vogel, H. H.**—The Koo-Mik. [New England Nat.] No. 5: 10-11, ill.

ANATOMY, PHYSIOLOGY, ETC.—Agar, W. E.—A gynandromorph grasshopper. [93] A, 109: 139-140, ill. **Ahmad, T.**—Ecological studies on the spotted bollworms

of cotton and their parasites: I.—The pre-imaginal development and viability of Earias fabia and Microbracon lefroyi under different conditions of temperature and humidity. [Indian J. Ent.] 1:17-47. **A. [yyar], T. [V. R.],**—Influence of the quality of food on the development of insects. [Indian J. Ent.] 1: 116-117. **Balch, R. E.**—Further notes on the fall cankerworm and its control by "Solid-stream" spraying. [Sci. Agric.] 19: 411-423, ill. **Batra, R. N.**—Phototropism in Schistocerca gregaria (Orth. Acrid.). [Indian J. Ent.] 1: 113. **Bhatia, D.**—The influence of dust-storms on the migrations of the desert locust. [Indian J. Ent.] 1: 49-51. **Bounhiol, J.-J.**—Recentes recherches experimentales sur les insectes. Les fonctions des corps allates (corpora allata). [Arch. Zool. Exp. & Gen.] 81, N. & R.: 54-64, ill. **Chatterjee, P. N.**—On the biology and morphology of Apanteles machaeralis (Braconidae, Hymen.). [Indian For. Rec.] 5: 381-395, ill. **Chauvin, R.**—Sur quelques différences pigmentaires entre les Criquets pèlerins grégaires et solitaires. [77] 132: 397-398. **Churney, L.**—A contribution to the anatomy and physiology of the salivary gland system in the larva of Chironomus (Dipt.). [J. Morph.] 66: 391-407, ill. **Codreanu, R.**—Recherches biologiques sur un Chironomide Symbiocladius rhithrogenae ectoparasite "cancerigene" des Ephemeres torrenticoles. [Arch. Zool. Exp. & Gen.] 81: 1-283, ill. **Corey, H. I.**—Chromomere vesicles in Orthopteran cells. [J. Morph.] 66: 299-321, ill. **Ehrenhardt, H.**—Experimentelle untersuchungen und freilandbeobachtungen uber den einfluss von Kälte und eis auf die blutlaus. [110] 6: 257-285, ill. **Eigenbrodt, H. J.**—The relationship of body size and egg size in Drosophila. [Trans. Ill. State Acad. Sci.] 32: 204-205. **Erschova**—(see Kosminsky, Erschova & Gusseva.) **Ferris & Pennebaker.**—The morphology of Agulla adnixa (Neuroptera: Raphidiidae). [Microent.] 4: 121-142, ill. **Ferris & Rees.**—The morphology of Panorpa nuptialis (Mecoptera: Panorpidae). [Microent.] 4: 79-108, ill. **Florkin & Frappez.**—Sur l'ammoniaque sanguine des Arthropodes. [77] 132: 486-487. **Frolova, S. L.**—Development of the giant nuclei of salivary gland type in different organs of Drosophila and their comparison with metabolic nuclei of larvae and imago. [Biol. Zhur.] 7: 703-736, ill. [Russian with English summary.] **Gertsch, W. J.**—(see under Arachnida). **Gohrbandt, I.**—See under Lepidoptera. **Gusseva.**—(Kosminsky, Erschova & Gusseva). **Hatcher, E.**—The consortes of certain North Carolina Blattids. [J. Elisha Mitchell Sci. Soc.]

55: 329-334. [**Hilton, W. A.**—Nervous system & sense organs] LXXXI: Coleoptera. [13] 31: 50-71, ill. **Jahn & Crescitelli.**—Diurnal changes in the electrical responses of the compound eyes. [92] 78: 42-52, ill. **Kauffmann, O.**—Der Luzerneblattnager (Phytonomus variabilis) [Coleo: Curculion.] [65] 26: 312-358; 387-448, ill. **Kohler, W.**—Der Einfluss verschiedenen Ernahrungsgrades auf ausseres Korpermerkmale, auf die Entwicklungsgeschwindigkeit Lebensdauer und Fortpflanzungsfahigkeit von Ephestia kuhniella. [97] 60: 34-69, ill. **Kosminsky, Erschova & Gusseva.**—Contributions to the genetics of the silk worm (Bombyx mori). XIX. New data on the "Recessive multilunar" character. [Biol. Zhur.] 7: 813-826, ill. [Russian with English summary.] **Krause, G.**—Die regulationsfahigkeit der Keimanlage von Tachycines (Orth.) im extraovatversuch. [87] 139: 639-723, ill. **Kuhn & Piepho.**—Uber die Ausbildung der Schuppen in Hauttransplantaten von Schmetterlingen. [97] 60: 1-22, ill. **Laabs, A.**—Brutfursorge und Brutpfluege einiger Hydrophiliden mit Berucksichtigung des Spinnapparates, seines ausseren Baues und seiner Tatigkeit. [46] 36: 123-178, ill. **Lal, K. B.**—The effect of host size upon the sex ratio of hymenopterous parasites and its bearing upon biological control work. [Indian J. Ent.] 1: 118-119. **Lauter & Vrla.**—Factors influencing the formation of the venom of the honeybee. [12] 32: 806-807. **Marken, W.**—Zur Kenntnis con Campodea. [46] 36: 41-88, ill. **Marshall, J.**—The hydrogen ion concentration of the digestive fluids and blood of the codling moth larva. [12] 32: 838-843, ill. **Oboussier, H.**—Beitrage zur Biologie und Anatomie der Wohnungsmilben. [65] 26: 253-296, ill. **Panshin, I. B.**—The cytogenetic nature of the position effect of the genes white (mottled) and cubitus interruptus. [Biol. Zhur.] 7: 837-868. [Russian with English summary]. **Patterson & Stone.**—Gynandromorphs in Drosophila melanogaster. [Univ. Texas Publ.] No. 3825: 67 pp., ill. **Peters, H. M.**—Problem des Kreuzspinnennetzes. [46] 36: 179-266, ill. **Rahman & Sohi.**—Observations on the reactions of the Dermestid beetle Trogoderma khapra to light. [Indian J. Ent.] 1: 57-63, ill. **Rees & Ferris.**—The morphology of Tipula reesi (Dipt.: Tipulid.). [Microent.] 4: 143-178, ill. **Rehm, E.**—Die Innervation der inneren organe von Apis mellifica. Zugleiche ein Beitrage zur frage des sog. sympathischen nervensystems der Insekten. [46] 36: 89-122, ill. **Riggert, E.**—Untersuchungen uber die Rubenblattwespe Athalia colibri

(Hymen.: Tenthred.). [65] 26: 462-516, ill. **Rosenkranz, W.**—Die Symbiose der Pentatomiden (Hemipt.). [46] 36: 279-309, ill. **Schmidt, E.**—Uber die Bedeutung des Pterostigmas bei Insekten. [Mitt. Deut. Ent. Ges.] 9: 53-56, ill. (k). **Schwerdtfeger, F.**—Untersuchungen uber die Wanderungen des Maikaefer-Engerlings (Melolontha melolontha & M. hippocastani). [65] 26: 215-252, ill. **Stone.**—(see Patterson & Stone). **Takai, M.**—On the reaction of Anomala cuprea to the lights of different wave lengths. [Oyo-Kontyu] 2: 20-24, ill. [in Japanese]. **Tate, P.**—The early stages of Limnophora exurda (Dipt.: Anthomyiid.). [116] 31: 479-485, ill. **Toth, L.**—Ueber die Biologie der Blattlaus Pemphigus spirothecae (Aphid.). [65] 26: 297-311, ill. **Tykac.**—L'influence des rayons ultra-violets sur les insects. [Casopis] 35: 68-70, [Czech with French summ.] **Weber, H.**—Beobachtungen uber die Wirkung von Empusa weberi auf die Larve von Raphidia ophiopsis. [65] 26: 522-535, ill. **Williams, J. L.**—The occurrence of spermatophores and their measurements in some British Lepidoptera. [Trans. Soc. Brit. Ent.] 6: 137-148, ill. **Wolf, E.**—Postural reactions of insect antennae. [92] 78: 1-8, ill. **Yalvac, S.**—Der Weibliche Gesleschtsapparat von Ixodes. [46] 36: 310-314, ill.

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Smith, C. N.—The male, nymph, and larva of Ixodes dentatus (Acarina: Ixodidae). [10] 42: 16-20, ill. **Yang, W.**—(See under Hemiptera).

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FLEAS OF EASTERN UNITED STATES. By IRVING FOX, Department of Zoology and Entomology, Iowa State College, Ames, Iowa. The Iowa State College Press, February, 1940. Pp. vii, 191, 31 plates of 166 figs. $3.00. The preface states: "Since many of the types of western species are in collections unavailable to the author, this work was necessarily confined to a consideration of the species reported as occurring in the East. Therefore, the keys and diagnoses of larger groups apply to the fleas which inhabit the eastern half of the United States, i. e., the region east of the one hundredth meridian with the exclusion of Texas. Fifty-five species, falling into five families comprising thirty-three genera, are now known to occur in this area. They parasitize about seventy-five mammalian and avian hosts including man and domestic animals, according to our present knowledge. With but few exceptions, the writer has seen specimens of all the eastern fleas, but of the types, for the most part, only those in the United States National Museum have been available to him. All illustrations and descriptions are original except a few which, because of the inability to obtain material, have been adapted from previous publications." The introduction occupies five pages and is concerned with collection and preservation of specimens, morphology and terminology, life history and control; the section on morphology and the figures on plate I, by which it is illustrated, are not as full and complete as those in the late Carroll Fox's *Insects and Disease of Man* (1925), to quote only one of recent American text books. The taxonomic or main portion of the text extends from page 7 to 110. Keys

are given to the two suborders, the Eastern families and genera, and to the Eastern species of most of the multispecific genera. The treatment of each of the better known species embraces references to previous descriptions and figures, separate descriptions of male and of female, records of material examined (the localities grouped under the state names, the latter arranged alphabetically), lists of the eastern hosts and eastern localities (state names only) and a statement on the type material and its location. The location of the material examined is not indicated, except in the most general way in the preface (page v). All of the species treated are illustrated by figures of structural details. One new genus, *Eptescopsylla,* is erected for *Nycteridopsylla chapini* Jordan. page 107; it would have been well to call attention to it in the preface also. There is a synonymic index, alphabetically arranged under genera, pp. 111-113, a systematic host index, pp. 114-119, a selected bibliography under authors' names arranged alphabetically, pp. 121-124, and an alphabetical index, pp. 125-127. The remaining pages are occupied by the plates and their explanations. It is interesting to note from the host index that the mammalian hosts are of the orders Marsupialia, Insectivora, Chiroptera, Carnivora, Rodentia, Lagomorpha, Artiodactyla and Primates. Under the Artiodactyla are listed the *horse,* the white-tailed deer and the hog; our citation of them is not primarily to remark that the horse is not usually grouped with the Artiodactyla, but that the three species of flea which have been found on these three ungulates, *Echidnophaga gallinacea, Oropsylla arctomys* and *Pulex irritans,* respectively, are more commonly found on other and widely different hosts. One wonders why it is that Ungulates have apparently escaped more extensive and intensive parasitization by fleas, seeing that certain species of mites, ticks, sucking and biting lice are peculiar to them. The last four named groups of arthropods are parasitic both as larvae and as adults, while no flea larvae are known to have this habit. In this connection a remark by Ewing (*Manual of External Parasites,* 1929, p. 153) has significance: Fleas "are especially abundant on rodents or on mammals that construct nests in which to rear their young or to hibernate." This volume by Irving Fox should prove to be of great convenience in bringing together in one volume data on our Eastern United States fleas.

P. P. CALVERT.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

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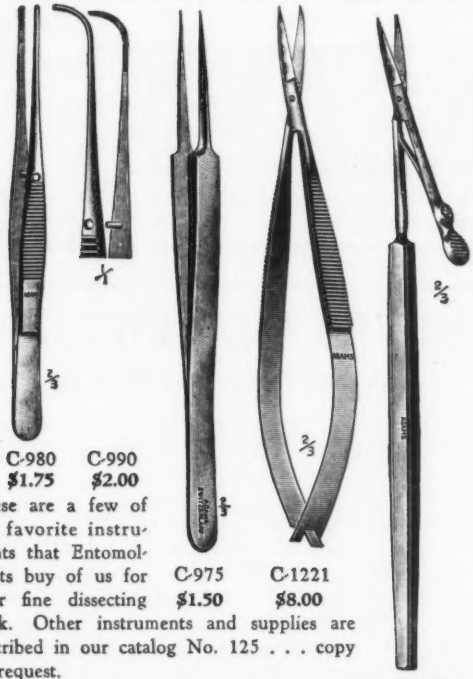

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